Message

From: Hamilton, John (IHS/PHX) [John.Hamilton@ihs.gov]
Sent: 2/5/2014 5:21:04 PM
To: Lee, Bessie [Lee.Bessie@epa.gov]
Subject: FW: conceptual HAMP design and cost estimate
Attachments: 1.31.14 HAMP Design Criteria and Calcs.pdf; HAMP COST ESTIMATE 1.31.14.pdf; HAMP Alignment 1.31.14.pdf

FYI
John

From: Hughes, Adam (IHS/PHX)
Sent: Friday, January 31, 2014 2:45 PM
To: Kerry Brough (kbrough@cox.net)
Cc: lpuhuyesva@hopi.nsn.us; bbettenberg@homerlaw.com; Rea, Brad (IHS/PHX); Lorenz, Robert (IHS/PHX); Matson, Eric (IHS/PHX); Hamilton, John (IHS/PHX)
Subject: RE: conceptual HAMP design and cost estimate

All:

Attached are my conceptual design (20% design) maps, cost estimates, and criteria and calculations that will be used in the PER and the SP, *for the HAMP Alternative*. Obviously, as this is a conceptual design only, there will be many future improvements and adjustments, but as our current emphasis is on completion of the PER, I will not be pursuing further HAMP design (i.e., to the 35% design level) until completion of the PER. I say that with the exception of pricing on the propane generators, which is expected sometime next week. If the pricing is a lot higher or a lot less than expected, I will update the cost estimate and resend to Kerry. I will also be updating Kerry at that time on the tentative generator sizing and fuel consumption, for his use in the SP.

Revisions that I have made over the past week, since my last email, include:

- The decision to place a chlorination facility at each Turquoise Trail Well, as opposed to trying to use 1 facility to chlorinate both Turquoise Trail Wells
- FMCV actual water usage data was received and input into my calculations
- Water Storage Tank sizing at the Radio Tower Tank Site was reduced from 2 twin 250,000 gallon tanks to 1 tank at 260,000 gallons
- The site cleared at the Radio Tower Tank Site is definitely large enough to accommodate another future tank, and the piping at the site could be arranged for such
- My water storage analysis found that the villages generally have sufficient storage now, and the HAMP will not be providing a large amount of additional storage
- I have sized the pumps/motors for the Turquoise Trail Wells – each will have a 100 hp submersible well pump which will pump to the surface, from there a 60 hp submersible pump/motor, housed in a baker monitor pitless adapter, will act as a booster to pump to the Radio Tower Tank
- Pricing from Grundfos on the 100 hp and 60 hp pumps/motors was only $20,000 and $28,000 – and if those are purchased through NECA and TP Pump, then NECA receives 50% off the stated price
- Every effort should be made to use NECA as the construction contractor – my pricing assumes that the job will be bid by misc. contractors – NECA's prices are generally much lower than those seen through open bid efforts and could be much lower than what I have estimated
- The HPUA director should be hired sooner rather than later, so that as the design progresses, the HPUA may be able to provide their preference in regards to various design options
- I updated some of the prices of the various line items – after reviewing the recent bid items from the San Carlos Bylas Master Plan, which is a similar USDA loan/grant funded regional project

Kerry, feel free to use the attached information as necessary for the SP and the cost-benefit-analysis. Please let me know if you have any questions. I realize that you are still awaiting the detailed information for the Treatment Alternative, and I have begun to make some progress in that direction, but I estimate that it will be at least 3-4 weeks before I have similar conceptual level (20% design) maps, cost estimates, and design calculations and assumptions for the Treatment Alternative.

Please feel free to email if you have any questions. I will be out of the office this coming week, February 3-7, but will be checking my email periodically and will respond as needed. I can also be reached by cell phone at 928-242-5661.

Regards,

From: Hughes, Adam (IHS/PHX)
Sent: Friday, January 24, 2014 1:54 PM
To: Kerry Brough (kbrough@cox.net); Rea, Brad (IHS/PHX); Lorenz, Robert (IHS/PHX); DeCoteau, Jesse (IHS/PHX); VanVleet, Joshua (IHS/PHX)
Subject: conceptual HAMP design and cost estimate

All:

I'm sending this info out for a quick review – I need to turn it around ASAP and get the final version to Kerry, so he can include it in the Cost Benefit Analysis, etc. By Thursday of next week, I will be sending Kerry the final conceptual design that will be used in the Cost Benefit Analysis – so please return comments to me before then.

Attached is the Design Criteria and Calculations I have to date, the current HAMP cost estimate, the current HAMP maps, and my design calc spreadsheet.

Major items for review and consideration in my conceptual design:

- Please review the construction pricing for general in-the-ballpark accuracy
- I added pricing for road excavation and repair – and it added up to a significant amount of money – let me know if you think the pricing appears reasonable
- Flow paced chlorination will be provided at the Wells for the HPUA's purposes. If Tawa'ovi later joins, they'll need to operate their own chlorination facility, just like the other villages.
- Only 1 chlorination facility has been budgeted for both Upper and Lower Sipaulovi/Mishongnovi. Our current plan is just to connect to the existing systems and let the two villages sort out their differences. Sipaulovi has been adamant that they want the HAMP to disconnect Upper Mishongnovi. More discussion is needed on this topic, unless we ignore Sipaulovi's request. The issue is complicated by the question of providing chlorination to the two villages, which are in such close proximity already, and whether Mishongnovi has the capability to operate their own chlorination facility, or whether perhaps the HPUA would want to take on that system, etc.
- All pipe is sized as 12" PVC, except from the booster station south to the cultural center, where it is proposed as 8", and then from there it branches towards Shungopavi and Sipaulovi/Mishongnovi, with each branch line being 6" PVC.
- Phase 1A is considered all of the facilities between the Wells and First Mesa, not including the proposed 500,000 gallons of HAMP water storage.
- Phase 1B is the 12" pipe going towards 2nd Mesa up to the 500K water storage tanks, and includes construction of the 500k WSTs.
- Phase 2 is the booster station and connection to Shungopavi.
- Phase 3 starts at the Cultural Center and includes all of the facilities serving Sipaulovi/Mishongovi.
- None of my calculations included the demand from the BIA
- For the FMCV demand, I used what was in the original draft PER
- I settled upon a growth rate of 1.8% and a design period of 20 years from 2015
- Cost benefit analysis will analyze a period of 50 to 60 yrs

- Mainline sizes are not significantly impacted by growth rate
- 10" mains could have been used instead of 12" – but may actually cost more due to it being a non-standard size
- There is no need to upsize the mains from what is herein proposed if the BIA did join in, even looking 50 yrs out
- Propane fuel consumption and bulk storage sizing is still pending (may be an item that O&M/Brad/Kiffer want to champion?)
- Smallest booster pump I could find to meet 2nd mesa's needs was a 15 hp – which may require 3 phase in the future, not just single phase
- Booster station and HAMP 500k storage was moved to as close to the Cultural Center as possible, to be close to power in the future
- Shungopavi concurrence on the location of the HAMP 500k gallon storage and the Proposed Upper Sipaulovi Tank is still pending
- I looked at required water storage from several angles, and determined that storage will be adequate through 2035 with the proposed HAMP 500k and 110k tanks
- Fire flow was not considered, as there is no organized fire response organization in the vicinity
- Flow Control Valves will be needed at the Polacca tank (set between 600-700 gpm) and at the Lower Sipaulovi tank (set at about 200 gpm).
- Final sizing of the pumps/motors for Well 2 and 3 is still pending
- Two PRVs will be needed coming down the hill from Upper Sipaulovi/Mishongnovi to Lower Sipaulovi/Mishongnovi
- I have a completed base hydraulic analysis for the system and have checked my mainline sizing and flowrates/velocities against the model to verify that the sizing seems appropriate.

Regards,

Adam Hughes, P.E.
LCDR, USPHS
Senior Environmental Engineer
Indian Health Service
928-537-0578